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ABSTRACT

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TOWARD THE ESTABLISHMENT OF NONCOGNITIVE FACTORS THROUGH LITERATURE SEARCH AND INTERPRETATION

by

John W. French

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July 1973

Technical Report No. 1

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Harry H. Harman
Principal Investigator

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Educational Testing Service
Princeton, New Jersey

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13. ABSTRACT

This report is on one aspect of a study that is trying to provide a reference basis for different researchers in their combined efforts to conceptualize and develop a theory and structure of human abilities and temperament. Specifically, the study is directed toward the identification of tests and other instruments that can serve as markers for well established factors.

It is the noncognitive area of the study to which the present report is addressed. There is sufficient concensus on many of the temperament factors to make a review and interpretation of recent factor analyses leading to such factors worthwhile. Separately presented in this report are 28 factors that can be called "established," in that they have been found at least three times in reports emanating from at least two different laboratories. It suggests and describes one to five subscales that might be used as marker variables. This literature review takes the form of a discussion of the various analyses in which the factor seems to have appeared and the extent to which the listed subscales measure it. The subscales of items, which this project will ultimately recommend as factor markers, will depend on the results of our own tryouts of the item categories listed in this report coupled with the findings reported in the literature.

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Toward the Establishment of Noncognitive Factors Through Literature Search and Interpretation

This report is on one aspect of a study that is trying to provide a reference basis for different researchers in their combined efforts to conceptualize and develop a theory and structure of human abilities and temperament. Specifically, the study is directed toward the identification of tests and other instruments that can serve as markers for well established factors. The results of such research should go a long way in providing a structure for the cognitive domain of human abilities and a beginning for a comparable structure for the temperament domain of personality. Such theoretical structures are founded on empirical evidence and are amenable to continued challenge and verification. Researchers would be expected to use the resulting factor Kits by selecting a small number of tests as markers for testing conjectures about factors in their studies.

To help set general guidelines for procedures to be used in the project a conference was convened which included about 20 prominent persons in the area of factor analysis and human assessment. Three guidelines that emerged are as follows: (1) A factor will be considered as "established" and markers for it will be included in the Kit if it is possible to identify it in at least three analyses performed in at least two different laboratories. (2) At least three tests will be provided as markers for each established cognitive factor; at least four measures will be provided as markers for an established noncognitive factor, two for each of the opposite poles. (3) Newly developed tests and other measures for both the cognitive and noncognitive domains will need to be field

tested in order to determine some of their basic statistical properties and to check their factorial content.

It is the noncognitive area of the study to which the present report is addressed. There is sufficient consensus on many of the temperament factors to make a review and interpretation of recent factor analyses leading to such factors worthwhile. The report covers a literature review since 1953, prior literature having been covered by French (1953). Noncognitive areas omitted from this report are those concerned with specific interest and attitudes and those using groups of subjects limited to children or to mental patients.

The limitation to "first-order" factors should also be noted. This limitation is actually an arbitrary one, but we can roughly define first-order factors as those that first appear when a rather wide variety of items or sets of items are factored. Factoring items that are severely limited to certain subject matters leads to overly specific factors or what can sometimes be called subfactors. On the other hand, factoring the intercorrelations among factors or factoring the intercorrelations among scales that represent factors leads to factors that are more general and can usually be called second-order factors. "Neuroticism" has been shown to be an example of a second-order factor.

Furthermore, we are going to omit from this review certain factors that can be considered to vary with the attitudes with which subjects respond to the questionnaire items. Such factors are stylistic rather than substantive even though they may be related to temperament. Examples of such factors are "acquiescence response set" and "tendency to respond in a socially desirable direction".

Separately presented in this report are 28 temperamental factors that can be called "established," in that they have been found at least three times in

at least two laboratories. Most of them are found for self-report questionnaires, but a few of them found for ratings by other persons are included, because, unlike the findings for analyses of objective tests, the factors revealed by studies of inter-person personality ratings do seem to cover the same domain of factors as do the studies of self-report questionnaires. Whether a factor is the same, or nearly so, from one study to another must be judged from the kinds of variables that have salient loadings on it. For each of the 28 factors this report suggests and describes one to five subscales that might be used as marker variables. Each of these subscales of items falls into a category that seems to represent one part or one aspect of the factor. It must be noted that the subscales had to be developed on a somewhat subjective basis. Items like those in a particular subscale may be characteristic of items in some studies in the literature where the factor was found but not in others. The reasonable assumption is made that a given factor repeatedly found in the literature will quite often be represented by only some of the item types or subfactors that may be attributed to it when one considers the entire literature. This literature review takes the form of a discussion of the various analyses in which the factor seems to have appeared and the extent to which the listed subscales measure it. Some of the factors contain all of the subscales for the factor, while similar factors found by other investigators may be limited to one or two only.

We recognize that two factors, differing in the nature of the items having high loadings on them, cannot strictly be called the same factor. However, there may be an underlying human trait or factor that seems different in two analyses merely because the two investigators did not include the same items in their analyses. By making psychological judgments about the similarity of

salient items on the factors in different analyses, we are making use of the published results as evidence on the basis of which to formulate hypotheses as to which categories of items would mark a factor, if they were all included in a new factor analytic study. This report, then, presents as hypotheses the item types that seem most likely to fall on each factor, and it presents the evidence from the factor-analytic literature upon which our hypotheses are based. The subscales of items, which this project will ultimately recommend as factor markers, will depend on the results of our own tryouts of the item categories listed in this report coupled with the findings reported in the literature.

It may be of interest to compare this list of factors to those described in French (1953). The resemblance is considerable, but the criteria for the two lists are different. Twenty of the factors are the same, except that the desirable pole of the factor has sometimes been changed so as to come first. Also, interest in philosophizing is now called Thoughtfulness. Persistence was split into two factors: morality and persistence. Six factors have been added as having been established since 1953. These are General Activity, Ac, Concentration, Co, Need for Achievement, Na, Open-minded vs Authoritarian, Om, Tolerant vs. Critical, To, and Well-being vs. Depression, Wb. Eleven factors were omitted as being strictly interest factors, seven were omitted, since they are only found among psychiatric subjects, and few others still do not measure up clearly to our criterion of an established factor. On logical grounds, Intelligence is not included among these so-called temperamental, non-cognitive factors.

Factor Ac: General Activity

A: Moves rapidly, quick in physical performances vs. slow
B: Busy, active in projects or (non-social) affairs vs. uninvolved, gets overburdened
C: Accomplishes things rapidly vs. indolent, unmotivated

This factor was recognized as "G" in the Guilford-Martin Inventory of Factors GAMIN (1943a) and appeared again in the Guilford-Zimmerman Temperament Survey (1949). Both of these covered all three of the above-named subscales, although GAMIN seemed to emphasize the first one. Guilford and Zimmerman (1956) have a factor called "General Activity" that combines all of the listed categories and also introduces the concepts of energy and impulsiveness. Jernigan and Demaree (1971) showed this factor broken into two parts, one they called "General Activity," including items related to moving rapidly or slowly, and a second they called "Industriousness" containing items in the area of being busy, energetic, or accomplishing things. It is interpreted here that this analysis broke down the "primary" factors into more specific factors like those we will be using as subscales. The word "energy," as used in some items, is difficult to interpret, because it is often not clear with which of the three areas listed above it is supposed to be associated. Sciortino (1969a) called one factor "Quickness"; it contained items only related to rapidity of movement, category A. In the same analysis he has another factor called "Energy" with items like "energetic, dynamic, active, and vigorous." These probably refer to situations like categories B or C appearing on a separate factor from his "Quickness." Baldwin (1961) found a factor called "General Activity," but in this dissertation abstract the content was not specified. It will be of interest to find out whether our tryouts of these concepts show them to be united on a single factor. Sells, Demaree, and Will (1970; 1971) obtain this factor primarily from Guilford's items, not Cattell's.

Factor Ag: Agreeableness

A: Interested in people's welfare, helpful vs. prefers making lone intellectual contributions
B: Cooperative, supportive, forgiving vs. irritated by people, vengeful
C: Adaptable, tends to agree, submissive vs. negativistic, domineering, aggressive
D: Trustful, confides in people vs. suspicious, keeps distance
E: Friendly, likeable, outgoing vs. aloof, unpleasant, withdrawn

In Cattell's earlier studies (CaA, CaB, and CaC in French, 1953) this factor was called "Cyclothymia vs. Schizothymia," and contains all of the above areas except A. The factor bearing the same identification in the 16 P. F. Questionnaire (Cattell et al. 1970), Factor A, "Affectothymia vs. Schizothymia" seems more generally related to liking to associate with other people in personal or business connections. It contains items in categories B, C, and D. Sells et al. (1970; 1971) put Cattell's A and Guilford's M (Masculinity) clearly on a factor they call "Cyclothymia vs. Schizothymia," a factor compact mainly of vocational preference items. Guilford's Factor Ag in the Guilford-Martin Personnel Inventory (1943b) is unclear in that the items are stated in negative terms. It is only with some doubt that they can be classified as C, D, and E, above. "Agreeableness" in Guilford and Zimmerman (1956) seems limited mostly to category C with some flavor of B, D, and E. Sells et al. (1970; 1971) found Guilford's Ag (Agreeableness) to load on factors other than the one described above. It seems to be associated with factor To (Tolerance) or Do (Dominance) described below. Borgatta's (1964) factor called "Likeability" loads items in categories B and E. Comrey and Scufi's (1961) factor called "Friendliness" is like E. Farber's (1962) factor of "Cooperativeness" brings together categories

A and B. "Agreeableness" in Norman (1963) has elements of B, C, and D. Sciortino's (1969a) factor called "Attentiveness" includes the checking of adjectives that seem to associate category A with Cooperativeness (category B) and, perhaps, some other generally desirable or stable traits.

Factor A1: Alertness

A: Alertness to immediate surroundings, attentive vs. unaware, engrossed, deep in thought, absent minded

This factor, to be distinguished from concentration or attentiveness to work, is minimally qualified as an "established" factor and has shown so little variety in the items loading it that only one subscale has been developed. Cattell (1957) reviews its history for his items; he calls it "Alert Extravert Interests," Q_8. It appeared in analyses GuB and RTC, two rotations of the same factor data, in French (1953) and was called "Alertness vs. Inattentiveness" by Comrey and Soufi (1961).

Factor Au: Autistic Tendency

A: Daydreams vs. has practical thoughts
B: Anxiety and worry that leads to autistic thinking vs. relaxed, adjusted, realistic thoughts
C: Bothered by daydreams or autistic distractions vs. enjoys these things

Both the recent literature and French (1953) have confirmed this factor for normal subjects. The earlier studies showed the association of loneliness with this factor, but loneliness has been omitted from the subscales above, since it might confuse the factor with Sociability or Gregariousness and could represent a practical situation merely giving rise to daydreaming rather than representing a temperamental trait. Cattell (1957) lists "Fantasy Tendency" as his factor numbered Q_5. Crumpton, Cantor and Batiste's (1960) factor called "Active and Disturbing Fantasy Life" is based on an analysis using patients in a mental institution for more than half of the subjects, but this emphasis, given in subscale C above, is by no means restricted to this analysis. Singer and Antrobus (1963) demonstrated several rather specific autistic factors by analyzing all items in a daydreaming scale among other cognitive and noncognitive items. Adcock and Adcock (1967), in a factor called "Vacillation", associate neurotic tendencies with daydreaming.

Factor Ca: Calmness vs. Anxiety

A: Relaxed, stable, at ease vs. anxious, worried (about self), edgy, uneasy, nervous, tense, restless (without cause)
B: Takes time to think, deliberate vs. overreacts, impulsive, jittery
C: Confident about the world vs. having fears or worries about outside influences

Anxiety is often confused with neuroticism, but a second-order factor that subsumes anxiety along with lack of Emotional Stability, lack of Surgency, and others can, perhaps, more properly be called Neurotic Tendency. A few older studies included the primary factor of "Anxiety" (French, 1953), but they all used mental patients as subjects. Cattell and Eber (1962) list the factor as "Ergic Tension," Q_4, with all of the above categories of items included. Comrey (1958 c and 1958 f), using about half mental patients, has a factor with items in category A that he calls "Worry." Crumpton, et al. (1960), using more than half mental patients, associates his anxious, worrying ruminative but unnamed fourth factor with feelings of personal inadequacy and the tendency to give up easily. This closely matches Comrey's concepts, but it is broader than Comrey's factor and seems to include elements of categories A, B, and C above. A number of factor analytic studies have isolated this factor using normal subjects. A factor that seems limited to category A is Khan's (1970) "Tension Anxiety." Factors having category A with some suggestions of B were found by Parker and Veldman (1969), Veldman and Parker (1970), Mitchell (1962), and Norman (1963). Besides Crumpton, et al., mentioned above, three studies, using only normal subjects, have items from all three of the above categories with high loadings on this factor: Farber (1962), O'Connor, Lorr, and Stafford (1956), and Butt (1970).

Factor Co: Concentration

A: Concentration on study or reading, restraint leading to maintenance of attention vs. mind wanders, bored, forgets names

The single subscale devised for this factor may well be factorially indistinguishable from some subscales of Persistence or Restraint, but it has been isolated a number of times. Comrey (1958 c and e; 1961), Comrey and Margraff (1958), and Comrey and Soufi (1960), calling the factor "Poor Concentration," found it to appear clearly even when analyzing different sets of items from the MMPI. Singer and Antrobus (1963) contributed the concepts of daydreaming, boredom, and lack of restraint. They associated it with neurotic tendencies using the name "Psychasthenia: poorly controlled thought or mind wandering." Kahn's (1970) factor was called "Hysteria with Physiological Reactions." His highest loadings were on concentration on single ideas or tasks, but other high loadings included "feeling no good" and "hand shaking" (tremor). In all of these analyses the positive pole represented the factor's less desirable aspect.

Factor De: Dependability

A: Likes rules, follows plans vs. likes freedom of choice, likes change
B: Dependable, punctual, keeps promises vs. careless about promises and details
C: Self-sentiment control, control of own feelings vs. actions and thoughts are swayed by emotions

There is some question here as to whether Cattell et al.'s (1970) Factor Q_3, "High Strength of Self-Sentiment vs. Low Self-Sentiment Integration" in the 16 P. F. Questionnaire is really the same as a factor that recurs rather clearly in the literature (five times listed in French, 1953; also in Mitchell, 1962, Norman, 1963, and Borgatta, 1964). The factor is called "Dependability," "Responsibility," or "Conscientiousness" and seems to deserve any or all these names. The factors found in the studies cited center heavily on category B above, and involve category A somewhat. On the other hand, Cattell's factor concentrates most heavily on items in category C with some but much less involvement of items in categories A and B. It makes some sense to think of Cattell'sconcept of self-sentiment control to be a psychological explanation for the more overt traits covered by categories A and B.

Factor Do: Dominance

A: Takes charge socially, wants power vs. submissive, willing to serve
B: Egoistic, pushes own ideas vs. respects others' ideas, self-effacing
C: Rights-conscious, complaining vs. tolerant

Items concerned with social confidence or talkativeness seem to be associated with this factor in its frequent occurrences in the literature, but a subscale representing such items was omitted in order to decrease overlap with other factors: Sociability and Well-Being. This factor is Cattell's "Dominance vs. Submissiveness," E. The subscales above are well represented in the 16 P. F. Questionnaire (Cattell & Eber, 1962) scale called "Assertive vs. Humble," E. More recent references are numerous. Guilford and Zimmerman (1956) cover all of these subscales in their factor A, Ascendance. Comrey, Jamison, and King (1968) also cover elements of all these categories in their factor number 11, although some items in these categories can also be found in other of their factors. Comrey and Soufi (1961) have a factor called "Ascendance vs. Timidity" that mainly represents category C. The following analyses seem to derive the factor from items suitable for subscales A and B: Borgatta (1964), Crumpton, et al. (1960), which gives it a rebellious or competitive slant, Cattell and Gibbons, (1968), and Sciortino, (1967). Comrey and Duffy's (1968) factor called "Submission" loads scales marking Cattell's factors "E" and "H" as well as other items suitable for subscales A and B above; this gives their factor an almost second-order character. It is not easy to categorize many items into categories A, B, or C, because some single temperamental qualities, such as self-confidence, can contribute to any of these subscales or even to another factor. However, it seems reasonable to say that subscales B and C can be seen in Comrey (1964) and Howarth and Brown (1971), while these two subscales

appear as separate factors in Jernigan and Demaree (1971). This same difficulty in categorization is also true with the following: Jamison and Comrey's (1969) "Submission" has a combination of A and B. Three analyses seem to cover only subscale B: Hallworth, Davies, and Gamston (1965), Warr, Lee, and Joreskog (1969), and Pedhazur (1971). The latter two call the factor "Self-Proselytization," since all salient items concern getting wound up in your own ideas in a discussion and failing to think about or respect other's ideas.

Factor E: Emotional Stability

A: Emotionally stable, tolerant, stolid vs. emotionally sensitive, irritable
B: Optimistic, faces problems vs. worrying, dwells on problems, escapist
C: Healthy, feels vigorous, vs. tired, intermittent loss of energy, hypochondriacal
D: Life is good, life is worthwhile vs. feels frustrated, dissatisfied

This factor is the one most frequently associated with neurotic tendency. However, the second-order factor combining this factor, Calmness vs. Anxiety, and others seems to be a better match for the rather general concept of neuroticism. This factor seems, on the contrary, to be taking on more specificity in recent studies. The factor called "Emotionally Stable vs. Affected by Feelings," C, in the 16 P. F. Questionnaire (Cattell and Eber, 1962) and the factor called "Emotional Stability" in the Guilford-Zimmerman Temperament Survey (1949) both represent all four item categories above, as do many of the factors cited in French (1953). However, more recent studies ascribe the concept of emotionality or its opposite, emotional stability, to more restricted factors. Factors with similar names are found in Comrey and Soufi (1960), Guilford, Christensen, Frick, and Merrifield (1961), Bendig (1962), Borgatta (1962), Becker (1963), and Bendig and Martin (1963). These have items mainly in category A above, although some category B concepts are present or suggested. Categories A and B are present in Adcock and Adcock's (1967) "Emotionality," and in Jernigan and Demaree's (1971) "Inuredness." Guilford and Zimmerman's (1956) "Emotionality" includes categories A and B plus some extraneous concepts of Emotional Maturity and Autistic Tendency. Item categories C or D are not present in these recent studies or sometimes appear on other factors in the same analyses. Our tryout of items in all of these categories will help to reconcile these differences. Sells et al. (1970; 1971) have a factor called "Emotional Stability," but it contains Guilford's N and C and Cattell's O and Q_4. This makes it seem more like Factor Wb, Well-Being vs. Depression.

Factor Em: Emotional Maturity

A: Patient, adjusts to frustration vs. verbally aggressive, demanding
B: Modest, shuns attention, outwardly directed vs. self-centered, seeks attention, egotistical
C: Satisfied, cooperates with authority vs. asserts independence from authority, stubborn

Early analyses (French, 1953) represent only A and B alone. Lingoes (1960), using somewhat over half neuropsychiatric patients, has a factor he called "Social Nonconformity," which strongly emphasizes category C, but has some items from A. Farber's (1962) factor called "Autonomy vs. Emotional Control of Self in Interaction" also contains a mixture of A and C. Finney (1961) has a factor called "Oral Aggression and Delinquency." This seems to represent only category A, since the delinquency is of the immature demanding rather than philosophically rebellious type. Bendig and Martin's (1962) "Exhibition, Aggression, and Succorance" has a strong emphasis on category B along with some A. Sells et al. (1970; 1971) have a factor called "Relaxed Composure vs. Suspicious Excitability." It is somewhat scattered but has most markers for Cattell's D, which he (1957) has called "Excitability vs. Emotional Maturity," a factor limited to categories A and B.

Factor Gs: Gregariousness

A: Likes to be with people physically vs. likes to be alone
B: Interest in occupations with people vs. interest in occupations isolated from people
C: Likes work or socializing with people vs. likes work alone or isolated activities

Of the nine analyses listed by French (1953) for Gregariousness, three also contain the Sociability factor and five contain the Self-Sufficiency factor. The three analyses listed below all have separate Sociability and Gregariousness factors. These results imply clearly that liking to be with people, taking part in social interaction, and being capable of getting along by oneself are three separate characteristics. Actually Gregariousness might have been omitted from this review, because it could be called an interest factor. However, interest in being with people seems qualitatively more temperamental than a particular subject matter interest. Baldwin (1961) calls one factor "Sociability" and the other "Social Aggressiveness," but since this is only a thesis abstract, it seemed unnecessary to pursue the matter, except to note the duality of social factors. Cattell and Gibbons (1968) have a factor that loads two scales on "Disliking Activity with Others." These scales use items from the Self-Sufficiency scale, Q_2, of the 16 P. F. Questionnaire (Cattell and Eber, 1962), but the items look more like lack of Gregariousness. Jernigan and Demaree (1971) have a good Sociability factor called "Social Competence" plus a factor called "Liking for Social Activities" representing categories A and C above. Their factor could also be said to represent one or more of the subscales for Self-Sufficiency. Because of the similarities of these three factors there will be particular interest in our tryouts that include these concepts.

Factor Me: Meticulousness

A: Meticulous, orderly, neat, careful, particular about personal effects vs. messy, careless, impulsive

This factor appeared in just two analyses in French (1953) but it showed up in much the same way in five of Comrey's studies (Comrey, 1964; Comrey & Jamison, 1966; Comrey, Jamison & King, 1968; Comrey & Duffy, 1968; and Jamison & Comrey, 1969), in Guilford, et al. (1961), which contributed the impulsiveness concept in the negative pole, and in Hallworth, et al. (1965), which included an element of considerateness. Included in some of these are a few concepts other than those mentioned in the single subscale described above. However, these broader aspects of Meticulousness are covered in the subscales of other factors. For example, "Cautiousness" often received a high loading in the above cited analyses, but it resembles too closely a subscale of the factor Restraint. Also "Drive to Finish" received repeated high loadings in Comrey's studies, but this is covered in the factor Persistence. It is noted here that this concept of Meticulousness resembles part of what Cattell and his associates identify as "Super-Ego Strength," particularly in studies using children as subjects (Cattell, 1963 and, to some extent, Cattell & Coan, 1957).

Factor Mo: Morality

A: Law-abiding, obedient, well-mannered, patriotic vs. free progressive, liberal
B: Moral, knows right from wrong; resists temptation vs. pleasure seeking
C: Generous, helpful, fair, gives to causes vs. selfish, uncharitable

Morality, as defined by the above categories, did not appear at all as a factor in the earlier studies. In one of these earlier analyses (analysis Ts in French, 1953) the highest loading of a rating on generosity was found on what otherwise seemed to be a clear factor of Persistence. The association between Morality and Persistence is fully demonstrated in the 16 P. F. Questionnaire (Cattell & Eber, 1962) on its scale for Conscientious vs. Expedient, G, which has items in all three categories above as well as items in all three categories listed elsewhere in this review under Persistence. For these reasons this factor was at first regarded as a part of Persistence, thus emphasizing Cattell's (1957) name for his Factor G, "Super-Ego Strength" (i.e., strength to resist immorality). However, more recent literature as well as psychological insight made it seem wise to separate Morality from Persistence. Pertinent factorial evidence for this, albeit not strong evidence, comes from Cattell and Gibbons (1968), where the short scale of "persistent effort" loaded a different factor from the one loaded by "lack of moral restraint." Adcock and Adcock (1967) call a factor "Ego-Ideal" that seems to include items from categories B and C above. Howarth and Brown (1971) have a factor called "Conscience" that represents categories B and C with a reference to "this country" that could be construed as involving category A. Warr, et al. (1969) call one of their factors "Virtuous Self-Denial." The content of this factor is limited to category C. A factorial test of these categories with those listed for Persistence will constitute a useful check on some of Cattell's conclusions and a useful check on our decision to separate Morality from Persistence.

Factor Na: Need for Achievement

A: Likes to do his best, works hard, persists until successful vs. play before work
B: Likes success in competition, likes getting ahead vs. dislikes competition
C: Strives for accomplishment, wants to produce something great vs. no motivation to do good or to help people

Bendig (1964) correlated items in a Need Achievement scale and came up with "Personal" and "Social" need achievement factors defined somewhat differently for the two sexes. This suggests subscales that are different from those listed above, although the above seem more representative of other findings in the literature. In the studies reviewed, only two factors, one in Bendig and Martin (1962) and one in Adcock and Adcock (1967), can with some question be construed to cover all three of the categories above. However, there was adequate evidence to demonstrate combinations of these concepts. Categories A and C were present in Mitchell's (1962) "Motivation for Intellectual Achievement," Sciortino's (1967) "Striving" found in an analysis of his Motivational Adjective Check List, Sciortino's (1970a) "Purposefulness," and Sciortino's (1970b) "Striving." A combination of B and C was clearly evident in Cattell, Horn and Butcher's (1962) "Self-Assertion Erg," Comrey's (1964) "Need to Excel," and in the Warr, et al. (1969) review of five studies in which they describe a factor called "Personal Ambition." Sciortino (1969b) called one factor "Alertness" because that adjective had the highest loading, but the other items constituted a good representation of category A above.

Factor O: Objectivity vs. Paranoid Tendency

A: Objectivity and fairness attributed to others vs. paranoid delusions about others
B: Credit is given by others vs. blame by others is unfair
C: Depends on others for help, advice, and sympathy vs. not interested in others, independent

In his analysis of the "F scale" of the MMPI, using both normal and institutionalized subjects, Comrey (1958e) was able to identify three separate factors having the characteristics of paranoia. The one being considered here is the only one that seems to have much variance for normal subjects. It appears in several of Comrey's analyses of the MMPI (Comrey, 1958a, 1958b, and 1958e; Comrey and Marggraff, 1958; and Comrey & Soufi, 1960). All of these have only items from category A above, except for Comrey (1958e), which seems to include categories A and C. Cattell's factor L in the 16 P. F. Questionnaire (Cattell and Eber, 1962) is called "Paranoid Trend" or "Trusting vs. Suspicious," and it has a few items like those in category A, but his factor seems more like our Tolerance vs. Cynical. Guilford's factor "O" (Objectivity) in the Guilford-Martin Personnel Inventory (1943b) and in the Guilford-Zimmerman Temperament Survey (1949) is the only instance where the concepts represented by A, B, and C are brought together. As noted above, only one of Comrey's analyses (1958e) combines A and C. Two analyses, Jernigan and Demaree (1971) and Howarth and Browne (1971), have factors combining A and B. Some others should be mentioned. Guilford and Zimmerman (1956) used subscales of the Guilford-Martin Inventory of Factors GAMIN and the Guilford-Martin Personnel Inventory and found an "Objectivity" factor that included categories A and C plus much emphasis on hypersensitivity and guilt. Astin's (1959) factor called "Hypersensitivity" also combined category A items with sensitivity and guilt.

Factor Om: Open-Minded vs. Authoritarian

A: Believes many different philosophies (religious or political views) can be reasonable vs. rigid belief in one philosophy, no tolerance of compromise
B: Respect for and interest in the religious and political philosophies of other people vs. strong belief in the rightness or wrongness of principles
C: Innovative, readiness for new ideas, flexible, foresighted vs. highly conservative, conventional, and unchangeable in ideas

There is obvious confusion among workers in this area centering around the words "Authoritarianism" and "Dogmatism." Pedhazur (1971) and Warr, Lee, and Joreskog (1969) analyze items in the F-Scale and the Rokeach Dogmatism Scale. There was close agreement on a factor they called "Belief in one truth" (category A above). Another consistent factor they called "Belief in one cause." The first is interpreted as a subscale of this factor, Open-Minded vs. Authoritarian. The second is interpreted as a general attitude or value ("...only when devoted to a cause is life meaningful"). The latter is not considered to be a part of this factor. Jay (1969) did a Q-technique factor analysis of the Rokeach Dogmatism Scale. He called one factor "Open-Mindedness." It contained some items in category A with a larger proportion of items in category B. Another of Jay's factors, called "Authoritarian or Need for Power," emphasized the perception that others need reform or enlightenment, and was interpreted as being different from the factor being described here. Sciortino (1969b, 1970a, 1970b), in his analyses of his adjective check lists, found factors that he called "Innovativeness," "Flexibility" or "Open-Mindedness." All of them coincide well with category C above. Thus, there is no factor analytic proof that A and B will share a factor with C, but this is a hypothesis that seems worth looking at in our factor tryouts.

Factor Pe: Persistence

A: Persistent, persevering, determined vs. quitting, fickle, needs change, gets discouraged
B: Likes stable tasks, interests are stable vs. likes changing tasks, interests change
C: Conscientious, careful, exacting, tidy, orderly vs. relaxed, carefree, nonchalant

Earlier studies (French, 1953) include these three categories of items, while the 16 P. F. Questionnaire's Factor G, "Superego Strength", includes not only these three kinds of items but those listed under the factor Morality as well. Some evidence for holding Morality and Persistence as separate factors is given under Morality. Two recent analyses have reasonably clear Persistence factors without items related to Morality. Sciortino's (1970a) factor called "Diversion" includes items in categories A and B. Cattell and Gibbons (1968) have a factor that can be identified as Persistence, since its highest loading is on "Persistent Effort." It is identified by the authors as "Self-Sentiment Control," Q_3. Sells et al. (1970, 1971) show a factor they call "Conscientiousness" to be allied to Guilford's Conscientiousness, CC, and to Cattell's G, which is close to the Persistence factor or, possibly, Morality.

Factor Po: Poise vs. Self-Consciousness

A: Enjoys group attention, exhibitionistic, poised vs. dislikes being in front of people
B: Enjoys performing in public, feels pride in speaking to a group vs. dislikes performing in public
C: Seeks comment and attention from important people vs. self-conscious with superiors, avoids criticism

This factor was recognized by Cattell (1957) as "Self-Consciousness in Public," Q_7. Comrey and Soufi (1961) wrote sets of items, covering categories A and B above, to mark this same factor, and they found it successfully, calling it "Poise vs. Self-Consciousness." The factor was found most clearly in two earlier analyses (Analyses La and Mo in French, 1953), where all three of the above categories of items had salient loadings. These findings make it a relatively clear factor but one that has been only barely established.

Factor Re: Relaxed vs. Nervous

A: Physically relaxed vs. fidgets, has nervous habits, twitches, has restless movements
B: Tolerant of physical, non-human or situational annoyances vs. irritated by mishaps and frustrating circumstances

"Nervousness" is fairly adequately defined by six analyses in French (1953). It is Factor N in the Guilford-Martin Inventory of Factors GAMIN (1943a), which clearly covers both of the above categories of items. It is noted that both of these sources include the item "Do you get easily rattled?" and other items like it. These were not included in the above subscales for this factor, because doing so would closely replicate items in Factor E, Emotional Stability. Despite this effort at purification, there remains here some overlap with Factor Ca, Calmness vs. Anxiety. Comrey and Soufi (1961) have similar items: A and B above, plus "easily rattled." Guilford and Zimmerman's (1956) factor called "Calmness, Composure vs. Nervousness" has items in categories A and B. O'Connor, Lorr, and Stafford's (1956) factor called "Motor Tension" helps to distinguish this factor from Ca, Calmness vs. Anxiety. It has items like A, but its items also resemble those in category A of Ca, while another factor in the O'Connor et al. analysis, called "Chronic Anxiety or Worry" covers the other categories of items for factor Ca, thus confirming the distinction. It will be important in our tryouts to attempt a distinction between subscale A of Factor Re and subscale A of Factor Ca.

Factor Rt: Restraint vs. Rhathymia

A: Planning vs. acting without thought, impulsive
B: Serious, responsible vs. lively, carefree, irresponsible, no thought of the future
C: Enjoys stable pursuits vs. wants excitement, change, wildness

In addition to its appearance in several earlier studies, this factor is recognized by Guilford as "Rhathymia vs. Restraint" in both his Inventory of Factors STDCR (1940) and in the Guilford-Zimmerman Temperament Survey (1949). All three categories of items appear in each inventory. In Guilford and Zimmerman (1956) category B seems to be emphasized, while markers for impulsiveness had higher loadings on General Activity. Cattell and Gibbons (1968) call "Residual," or difficult to interpret a factor which loads scales for "Rhathymia" and "Carefreeness," while impulsiveness fails to load any factor. Comrey and Soufi (1961) brings together B and C in a factor labelled "Rhathymia." They also obtained a separate factor; tentatively identified as "Restraint" that includes items like those in category A. Adcock & Adcock (1967) on a factor called "Ego Control" bring together A and B. Barratt (1965) has only category C items in a factor called "Risk Taking." Some doubt is thrown on the unity of A and B on the same factor by Butt (1970) and by Howarth and Browne (1971), both of whom have one factor with category B items and another "Impulsiveness" factor with category A items. This situation is similar to analyses GuB and RTC in French (1953), both of which have Factor RT with items in categories A, B, and C but also have a separate factor that is mainly impulsive and loaded in addition by category A items. In analysis GuB items concerning impulsiveness and stopping

to think before acting actually have their highest loadings on the "Rhathymia" factor even though they are the very items that identify the other factor as impulsiveness. Further study of the factor unity of these concepts is most certainly needed.

Factor Sc: Self-Confidence

A: Feels confident physically, personally, and career-wise vs. needs encouragement, feels inferior, afraid of failure
B: Claims to have abilities, skills, and good experiences vs. claims handicaps, ineptitude, and unfavorable experiences
C: Perceives others as having been positive toward him vs. negative

Inferiority Feelings, Factor I in the Guilford-Martin Inventory of Factors GAMIN (1943a), covers the three concepts listed above. To some extent in that battery and in Guilford and Zimmerman (1956) as well as in a few other studies noted below, Self-Confidence is accompanied by items concerned with social confidence, poise, nervousness, being easily upset, not happy, or being self-centered. These more social or more emotional facets of self-confidence are omitted from the subscales of this factor because they would overlap with factors such as Sociability, Anxiety, Emotional Stability, or Well-Being. Two analyses, Butt (1970) and Khan (1970), seem clearly to have found this factor, although their items are limited to those in category A mixed with some social and emotionality items. O'Connor, Lorr, and Stafford (1956) have a factor called "Sense of Personal Inadequacy" that contains A and B and also an item on being "easily upset."

Factor Se: Sensitive Attitude

A: Warm, soft, cooperative, kind, considerate vs. hard, stern, bossy
B: Emotionally sensitive, empathic, delicate, quiet vs. robust, noisy, active, tough, fearless
C: Interest in people's welfare, religion vs. interest in people for companionship or fun
D: Interest in imaginative ideas, music, esthetics, literature vs. interest in practical, technical, political, and economic ideas

Both the earlier analyses (French, 1953) and the ones being reported here each encompass two of the four above categories named above in various combinations. Cattell's (1970) Factor I Premsia vs. Harria, in the 16 P. F. Questionnaire includes C and D, with just a few items that can be called B. Comrey and Duffy (1968) has a fair representation of A, B, and C. Categories A and B are represented in Adcock and Adcock's (1967) "Compassion," in Richards' (1966) "Sensitivity to Others," and in Veldman and Parker's (1970) "Social Warmth." Categories B and C are combined in the factor called "Empathy" in Comrey and Jamison (1966), Comrey, Jamison and King (1968), and Jamison and Comrey (1969). Cattell and Gibbons (1968) follow Cattell's emphasis on category D items combined with some C. Their factor is marked by items for Guilford's M and Cattell's I, and has a close relationship to the sex of the respondent. Mitchell's (1962) factor called "Warm Hearted Attitude Towards Others" has nothing but the items of that type in category A. Tryout analyses will be very valuable in confirming the unity of this factor. However, it will be necessary to avoid an interpretation of unity for these four subscales in an analysis that included both sexes, because females are likely to score higher than males on all four subscales, thus giving rise to some artifactual intercorrelation among them.

Factor So: Sociability

A: Competent socially, social organizer, enjoys attention vs. withdrawn, fears public speaking and social responsibilities
B: Glib talker, has superficial social know-how vs. aloof, doesn't know or care what should be said
C: Hardened socially, confident in social contacts vs. shy, socially insecure

The pattern of items for this factor is rather consistent from laboratory to laboratory. Factor H, "Parmia vs. Threctia", in the 16 P. F. Questionnaire (Cattell & Eber, 1962) and Guilford's "Sociability", S, in his Inventory of Factors STDCR (1940) and in the Guilford-Zimmerman Temperament Survey (1949) all have a rather even distribution of the three item categories listed above. Sells et al. (1970; 1971) brings these factors together in their "conjoint analysis." Recent studies having "Sociability" or "Shyness" factors that cover all three of these subscales are Comrey and Duffy (1968); Hallworth (1964); Hallworth, Davies, and Gamston (1965); Comrey and Jamison (1966); Comrey et al. (1968); and Jamison and Comrey (1969). Numerous other analyses listed below have identified this factor, relying on only one or two of the above item categories. It is not easy to place items in one or another of these categories or even to distinguish such items from those that belong on the other factors, Gregariousness or Self-Sufficiency.

Author(s)	Date	Factor Name	Items
Astin	1959	Self Esteem	B,C
Baldwin	1961	Social Aggressive	C
Borgatta & Eschenbach	1955	Social Acceptability	A,C.
Cattell & Gibbons	1968	"H"	A,C
Comrey	1957b	Shyness	B,C
Comrey	1958a	Shyness	B,C
Comrey	1958d	Shyness	B,C
Comrey	1958f	Shyness	B

Author(s)	Date	Factor Name	Items
Comrey & Soufi	1960	Shyness	A, C
Comrey & Soufi	1961	Social Initiative	C
Comrey	1964	Friendliness	C
Guilford & Zimmerman	1956	Sociability	A, C
Howarth & Browne	1971	Sociability	A, C
Jernigan & Demaree	1971	Social Competence	B, C
Lingoes	1960	Denial of Soc. Anxiety	A, C
Mitchell	1962	Social Poise	A, C
Parker & Veldman	1969	Introversion	B, C
Richards	1966	Sociability	A, C
Sciortino (two factors)	1969a	Sociability Articulateness	C B
Sciortino (stet)	1970b	Congeniality Articulateness	C B
Veldman & Parker	1970	Introversion	B, C

It seems reasonable to conclude that Sciortino has broken the primary factor of Sociability into two of the subscales that are listed above as markers for Sociability. Our tryouts should shed light on this situation.

Factor Ss: Self-Sufficiency

A: Self-sufficient, likes to be alone in stress, in planning, in facing problems, makes own plans, dislikes being served, self-reliant, decisive vs. dependent, needs help from others, group dependent
B: Desires to be different, individualistic, free vs. needs approval of others, conforms, accepts social order, agrees with group, likes affiliation, complies
C: Unusual ideas, unconventional, idealistic, reflective vs. has majority opinions, tends to have same feelings as others
D: Emotional independence vs. needs love, friends, succorance, and protection

This is a factor that could be confused with Self-Confidence, the reverse of Sociability or the reverse of Gregariousness. However, among the 11 occurrences of this factor in French (1953) and among the more recent analyses, there are many instances where one or more of these three other factors appear concurrently with but separately from Self-Sufficiency. All four of the above item types do not occur in any one of the analyses being reviewed, but various combinations of them provide a likelihood that they will fall on the same factor when administered in our tryout. Item categories A, B, and D appear in the factor called "Dependence" in Comrey (1964) Comrey and Jamison (1966), and Comrey, Jamison & King (1968). Comrey and Duffy's (1968) "Socialization" has A, B, and C, but their factor called "Dependence" shows category D items on a separate factor. Jamison and Comrey's (1969) "Socialization" is a clear factor with B only. Type B appears in Howarth and Browne's (1971) "Group Affiliation." A and B occur in Sciortino's (1970b) "Individuality." Types B and C are combined in Sciortino's (1970a) "Independence" and Veldman and Parker's (1970) "Individualism."

Factor Su: Surgency vs. Repression

A: Exuberant, enthusiastic, cheerful vs. repressed, reserved, inhibited
B: Likes to stimulate and cheer up people vs. quiet stay at home
C: Talks without inhibition, expressive, frank vs. cautious in talking, precise, secretive

This factor uses Cattell's name, Surgency, since it is much like his Factor F in the 16 P. F. Questionnaire (Cattell et al., 1970) and elsewhere, except that the concept of liking excitement has been eliminated, since it is represented in Factor Rt, Restraint. In French (1953) Surgency occurs concomitantly with Sociability in five analyses. In the analyses being reviewed here, Surgency and Sociability occur together in four analyses: Cattell (1963), Cattell and Coan (1957), Comrey and Soufi (1961), and Lingoes (1960). This illustrates the distinction between them, although two analyses in French (1953), RTA and Ts, have elements of both Sociability and Surgency on the same factor. Also, Surgency vs. Repression is not easy to distinguish from Well Being vs. Depression. Fortunately, Lingoes (1960) separates both of these factors in the same analysis. The recent literature does not reveal any factors with all three of the above item categories together. Lingoes calls the Surgency factor "Inhibition and Apathy;" it has item types A and B. Barratt's (1965) "Adventure Seeking (Extroversion)" has items in category A with some items on liking excitement. This same analysis has a factor called "Risk Taking," which has much more of the excitement concept in it than does his "Adventure Seeking," and so has been indentified under Factor Rt. Norman's (1963) "Extroversion or Surgency" might be Surgency, Sociability, or a combination of the two. In this study adventurousness may be interpreted as exuberance, and so items in categories A and C seem recognizable.

Factor T: Thoughtfulness

A: Likes to think, reflect, meditate vs. prevented from doing it by social or business activity
B: Likes to think about people or with people vs. enjoys the company of people without analyzing them
C: Thinks about self vs. carefree about self
D: Intellectual interests vs. active interests

This is Guilford's Factor T, originally called "Liking Thinking" or "Thinking Introversion," now called "Thoughtfulness" in the Guilford-Zimmerman Temperament Survey (1949), where items can be classified into all four of the above categories. Guilford and Zimmerman's (1956) "Reflectiveness" has items in categories A, B, and C. Guilford et al. (1961) has a factor called "Meditative Thinking" that seems limited to category A. Others having all four item types are Comrey, Jamison and King's (1968) "Thoughtfulness" and Sciortino's (1969b) "Meditativity." Combinations of A B, and C are found in Jernigan and Demaree's (1971) "Thoughtfulness" as well as in the Guilford and Zimmerman paper already mentioned. A, C, and D appear in Sciortino's (1970b) "Meditativeness." Sciortino's (1970a) "Self Awareness" has A and C. Parker and Veldman's (1969) "Intraception" has only category A with a rather strong flavor of Self-Sufficiency.

Factor To: Tolerance of Human Nature and Things vs. Criticalness

A: Naive, impunitive, believes people are honest and fair vs. believes people lie and are unfair to gain an advantage
B: Believes people are capable of good work vs. critical, fault finding
C: Tolerant of human nature vs. cynical about human nature
D: Tolerates or respects people vs. feels hostility (covert, not overt) against people or groups of people.
E: Tolerates the imperfections in things vs. feels hostility toward things that fail to work

Factor Co (Cooperativeness) from the Guilford-Martin Personnel Inventory (1943b) is the only source that shows the above five item categories together. Substantiation or lack of it for a factor covering these five subscales will be of interest in our tryouts. In other literature all combinations of the above five do occur, but the data are not highly convincing, because many items cannot be placed with confidence into one or another of the categories. A table will summarize the literature most clearly:

Author(s)	Date	Factor Name	Item Categories	Irrelevant concepts also appearing on the factor
Bendig	1961	Covert Hostility	D	Guilt
Bendig	1962	Covert Hostility	D	
Comrey	1957a	Cynicism	C	Persistence
(two factors)		Hostility	D,E	
Comrey	1957b	Cynicism	A,C	
Comrey	1958b	Cynicism	A	
Comrey	1958e	Psychopathic Personality	D,E	
Comrey	1958e	Cynicism	A	
(two factors)		Hostility	E	
Comrey	1964	Hostility	A,C,D	

Author(s)	Date	Factor Name	Item Categories	Irrelevant Concepts
Comrey & Duffy	1968	Hostility	A,B,C,D	Lack of objectivity
Comrey & Soufi	1960	Cynicism	A,C	Lack of objectivity
Comrey & Soufi	1961	Hostility	C,D	
Guilford & Zimmerman	1956	Cooperativeness, Tolerance	A,B,C	Self-centeredness, self pitying
Howarth & Browne	1971	Individual Tolerance	B,C	
(two factors)		Trust vs. Suspicion	A	
Jamison & Comrey	1969	Hostility	A,B,C,D	Lack of objectiveness
Jernigan & Demaree	1971	Personal Relations	B,C	
Krug	1961	Cynicism	C,D	"Prying" interpreted as D
Lingoes	1960	Denial of distrust and hostility	A,D	Need for affection, paranoia
Mitchell	1962	Offensive social conduct	B	Stubbornness
Pedhazur	1971	Isolation, Alienation	B,C,D	
Sells et al.	1970-1971	Personal Relations	"Guilford's Co"	
Warr, et al.	1969	Isolation, Alienation	B,C,D	

In three analyses in the above table the primary factor has split into two factors each defined by one or two of the proposed subscales.

Factor Wb: Well-being vs. Depression

A: Has Feeling of well-being, happy vs. depressed, blue, lonely
B: Hopeful, interested in life vs. fear and worry about doom or vague dangers
C: Confident, can stand criticism vs. guilt prone, feels worthless and spurned, worries about himself

This factor (Wb) is difficult to distinguish from Surgency vs. Repression (Su) and from second order Neuroticism. Fortunately Wb and Su do both seem to appear together as Factor F, "Surgency," and as Factor O, "Untroubled Adequacy" in the 16 P. F. Questionnaire (Cattell et al., 1970). They are also found together in later studies with children, Cattell and Coan (1957) and Cattell (1963), and by one analysis using adults, Lingoes (1960). In his book, Cattell (1957) calls his Factor O "Guilt Proness vs. Confidence." He "projects his factors into the abnormal," saying that Guilt Proneness becomes "Anxious Depression" and that Surgency becomes "Euphoric Mania vs. Simple Depression." Sells et al. (1970; 1971) have a factor called "Emotional Stability," which is not clear but has much of this factor within it. Combinations of item categories appear in the analyses tabled below.

Author(s)	Date	Factor Name	Item Categories	Irrelevant Concepts
Cattell & Gibbons	1968	Placid vs. Apprehensive, O	A, B, C	Emotional Stability
Comrey	1957a	Neuroticism	-A, B, C	
(same analysis		Euphoria	+A	Energy
Comrey	1957b	Neuroticism	A, B	
Comrey	1958a	Neuroticism	-A, B	
(same analysis)		Euphoria	+A	
Comrey	1958c	Neuroticism	C	

Author(s)	Date	Factor Name	Item Categories	Irrelevant Concepts
Comrey	1958e	Euphoria	C	Energy
Comrey	1958f	Euphoria	A	Energy
Comrey & Jamison	1966	Neuroticism	A,B,C	Agitation
Comrey et al.	1968	Neuroticism	A,B,C	Agitation, moodiness
Comrey & Soufi	1961	Cheerfulness vs. Depression	A,B,C	
Howarth & Browne	1971	Emotional Stability	A	Dreams, upset
Jamison & Comrey	1969	Neuroticism	A,B,C	Agitation
Jernigan & Demaree	1971	Emotional Stability	A	Fatigue, moodiness

Two of Comrey's analyses seem to have placed opposite poles (+ and -) of subscale A on separate factors. The tryout will be valuable in checking the factorial unity of the proposed subscales and their opposite poles.

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